

App. No. 09/997,056
Amendment Dated April 3, 2007
Reply to Office Action of January 3, 2007

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Amendments to the Claims:

1. (Currently amended) A computer system for generating metadata for use during stack unwinding, comprising:
 - a plurality of procedures, wherein each procedure comprises a sequence of binary instructions;
 - a runtime for generating unwind data, wherein the unwind data includes a first plurality of blocks of metadata having a first order of blocks, wherein each block of metadata is associated with a corresponding procedure in the plurality of procedures, wherein each block of metadata in the plurality of blocks of metadata includes at least one unwind table and at least one unwind information block; and
 - an unwind rewriter programmed to obtain the unwind data and reorder the first plurality of blocks of metadata to generate a second plurality of blocks of metadata having a second order, wherein the unwind rewriter reorders the first plurality of blocks in accordance with a second unwind table and a second unwind information block, wherein the first plurality of blocks are reordered in response to a modification of the sequence of binary instructions within a procedure, such that the second plurality of blocks of metadata accurately represents the same runtime semantics as that of the unmodified sequence of binary instructions.
2. (Cancelled)
3. (Currently amended) The computer system of claim [[2]]1, wherein the at least one unwind information block includes a region header describing a region of zero length.
4. (Currently amended) A computer-implemented method of regenerating unwind data for a modified binary procedure wherein a current order of basic blocks within the modified binary procedure differs from an original order of the basic blocks, the computer-implemented method comprising:
 - obtaining original unwind data that describes the original order of the basic blocks, wherein the original unwind data is associated with an unwind table and unwind descriptor records;

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regenerating new unwind data from the original unwind data, wherein regenerating new unwind data includes generating new unwind tables and new unwind descriptor records, wherein the new unwind data includes a reordering of the original order of basic blocks, and wherein the reordering represents the same runtime semantics as that of the unmodified sequence of binary instructions; and

writing the new unwind data to the modified binary procedure.

5. (Previously presented) The method of claim 4, wherein obtaining the unwind data comprises parsing the original unwind data that describes the original order of the basic blocks.

6. (Original) The method of claim 5, wherein parsing the original unwind data comprises identifying a start basic block and an end basic block of a region associated with the modified binary procedure.

7. (Original) The method of claim 6, wherein identifying the end basic block of the region further comprises splitting a single basic block into two basic blocks, such that a first basic block ends on a last instruction of the region.

8. (Original) The method of claim 6, wherein parsing the original unwind data further comprises identifying an unwind information block associated with a basic block in the original order of the basic blocks that includes a when action description record and establishing a link between the when action description record and the corresponding instruction in the basic block.

9. (Cancelled)

10. (Currently amended) The method of claim [[9]]4, wherein regenerating the new unwind descriptor records further comprises determining if when basic blocks identified in a single unwind table associated with the original order of basic blocks are associated with more than one unwind table associated with the current order of basic blocks, and ~~if so,~~ creating a new region header describing a region of zero length when the basic blocks identified in the single

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unwind table associated with the original order of basic blocks are associated with more than one unwind table associated with the current order of basic blocks.

11. (Currently amended) A computer-implemented method for regenerating unwind data in response to a binary modification to a procedure, the procedure including a plurality of basic blocks, comprising:

receiving unwind data comprising an unwind table and a plurality of unwind descriptor records wherein the unwind data is associated with a procedure having binary instructions;

modifying the procedure to perturb the binary instructions of the procedure;

parsing the unwind data to identify a start basic block and an end basic block for a region associated with the procedure; and

rewriting the unwind data, wherein the rewriting of unwind data includes a reordering of unwind data, ~~a~~ in accordance with a second unwind table and a second plurality of unwind descriptor records such that the rewritten unwind data accurately represents the runtime semantics of the binary instructions before the binary instructions were perturbed.

12. (Previously presented) The computer-implemented method of claim 11, wherein parsing the unwind data further comprises generating a relationship between a when-descriptor within an unwind descriptor record and an instruction in the procedure, and rewriting the unwind data further comprises associating the when-descriptor with an appropriate unwind descriptor record in the second plurality of unwind descriptor records.

13. (Original) The method of claim 11, wherein identifying the end basic block of the region further comprises splitting a single basic block into two basic blocks, such that a first basic block ends on a last instruction of the region.

14. (Currently amended) The method of claim 11, wherein generating the second plurality of unwind descriptor records further comprises determining if when basic blocks identified in a single unwind table associated with the unmodified procedure are associated with more than one unwind table associated with the binary modified procedure, and if so, creating a

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new region header describing a region of zero length when the basic blocks identified in the single unwind table associated with the unmodified procedure are associated with more than one unwind table associated with the binary modified procedure.

15-18. (Cancelled)

19. (Currently amended) A computer-readable storage medium having computer-executable instructions for rewriting unwind data in response to a binary modification to a procedure, the procedure including a plurality of basic blocks, the instructions comprising:

receiving unwind data comprising an unwind table and a plurality of unwind descriptor records wherein the unwind data is associated with a procedure having binary instructions;

modifying the procedure to perturb the binary instructions of the procedure;

parsing the unwind data to identify a start basic block and an end basic block for a region associated with the procedure; and

rewriting the unwind data, wherein the rewritten unwind data includes a reordering of the unwind data, according to a second unwind table and a second plurality of unwind descriptor records such that the rewritten unwind data accurately represents the runtime semantics of the binary instructions before the binary instructions were perturbed.

20. (Currently amended) A computer-readable storage medium having computer-executable instructions for rewriting unwind data wherein a current order of basic blocks within the modified binary procedure differs from an original order of the basic blocks, the instructions comprising:

obtaining original unwind data that describes the original order of the basic blocks, wherein the original unwind data is associated with an unwind table and unwind descriptor records;

rewriting the original unwind data, wherein the rewritten unwind data includes a reordering of the original order of basic blocks, wherein rewriting the original unwind data includes generating new unwind tables and new unwind descriptor records, and wherein the

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reordering represents the runtime semantics of the binary procedure before the binary procedure was modified; and

writing the rewritten unwind data to the modified binary procedure.